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Remarks on the Group *Cinnamomeæ* of the North American Roses.

BY G. N. BEST.

These remarks are based on an examination of the large and valuable collection of the Geological and Natural History Survey of Canada, Prof. John Macoun; the collections of Lafayette College, Prof. T. C. Porter, and of the Philadelphia Academy of Natural Sciences, Mr. J. H. Redfield; contributions from Rev. R. E. Schuh, Minnesota; Mr. Chas. V. Piper, Seattle, Washington; Dr. N. L. Britton, Dr. Sereno Watson, Mr. A. S. Hitchcock, St. Louis, Mo., and Mr. O. A. Farwell, Mich., to all of whom I tender my sincere acknowledgments.

To M. Crépin, the distinguished rhodologist of Brussels, I am likewise under many obligations, not only for rare specimens, illustrative of the species of the Old World, by which I was enabled to compare allied forms of this country, but also for making me acquainted with the results of his very extensive and valuable observations. While the views herein expressed are believed to be largely in accord with those entertained by him, the author, however, is solely responsible for them.

The group *Cinnamomeæ*, enlarged so as to include the *Gymnocarpæ* and the *Alpinæ*, is confessedly a difficult one with which to deal. Scarcely a species but occupies more or less debateable ground. The geographical distributions are far from being accurately known. In this respect the best that can often be done is an approximation. Much time and patient labor are yet re-

quired before satisfactory results can be attained. These remarks are therefore to be regarded as strictly preliminary.

The importance of good material is so great that a few suggestions as to collecting, it is hoped, will be pardonable. A small flowering or fruiting branch makes a beautiful specimen, but for systematic study it is often quite useless, in that it fails to furnish some of the more essential characters. Specimens should be collected either in flower or in fully matured fruit—just before the falling of the leaves; the latter is to be preferred. A few of the younger, sterile growths of the season should be included. Since stoutness or depauperateness modifies very markedly the characters, it is desirable to collect from both. When possible, the whole bush should be pressed, dividing it in sections if necessary. At all events, enough of the stem should be secured to show the normal arrangement of the spines; this not infrequently varies in different parts of the bush.

Few plants are more strikingly modified by differences in environment than roses. Even the younger growths appear quite different from the older, so much so indeed as to cause them to be taken for different species. A knowledge, therefore, of the value of characters is desirable. Quite contrary to what was once thought, the varying degrees of pubescence, glaucousness, glandulosity, and, to some extent, of prickles, possess little diagnostic value; and are to be considered most frequently as accidents of growth depending on peculiarities of soil and location for their development. Not that they are wholly devoid of value, but are so only when taken in connection with characters of the first order.

The larger prickles, commonly but erroneously called spines, furnish important indications, not so much by their shape and size, as by their arrangement on the stem and branches. Valuable as this character is, there is no other that taxes more the experience and judgment of the rhodologist. In rank bushes the spines may be stout and curved; in depauperate slender and straight, yet belong to the same species. They are frequently absent from bushes to which they normally belong, and this from no known cause. The friction of high water often removes them from such as grow on the banks of streams or low places subject

to inundations. It is not rare to find geminate spines grading to single ones on flowering branches, thus appearing and in fact being alternate. On stems normally devoid of spines, it is not uncommon to see two or more of the prickles about the nodes somewhat enlarged. This condition leads to the error of taking them for true geminate spines, which they are not. A little patient study, however, usually suffices to clear up the difficulty in distinguishing the normal type.

The behaviour of the sepals during anthesis and the maturing of the fruit, likewise furnish valuable indications, but not so much as do their adnation. They may be persistent on the fruit when fully matured; they may be deciduous by a clear circumscision at their base, or through the apex of the fruit. It is sometimes difficult, not to say impossible, to distinguish the mode of adnation in immature fruit. Sepals are either entire or lobed; when the outer are but slightly lobed, it should be regarded as simply a passing variation from the entire form.

Beyond the mere fact that the styles may be free or connate, little of practical importance has accrued from a very careful study of them. While quite variable, the leaflets vary around a type which is quite constant in the same species. In the more glandular forms, the tothing may be compound-glandular or serrulate, while in those less resinous it may be nearly or quite simple. The stipules, modified leaflets, are characters of varying import. In some groups and in some species they possess diagnostic value; in others they have little significance. It is by their general shape rather than by their width they merit attention. In drying they may become involute, revolute or remain plane. Taking them all in all, they do not possess the value usually allowed them.

The petals, the habit of the bush, its in-ground ramifications, the shape, size and color of the fruit, the number, shape and size of the seed, although usually of secondary importance, yet frequently furnish valuable indications. The insertion of the ovules, as recently pointed out by M. Crépin, is worthy of more than a passing notice. This may be either strictly basil or basilo-parietal. In the *Cinnamomeæ* it is the latter; in the *Carolinæ* it is basil. It is needless to say that in roses as in other plants, it is more by the

tout ensemble than by any single character that a correct knowledge of its position is to be attained.

CLASSIFICATION.

ROSA, Tourn.

GROUP CINNAMOMEÆ,* CRÉPIN.

Styles free, included ; insertion of the ovules basilo-parietal ; sepals usually erect and persistent on the matured fruit ; inflorescence unifloral or multifloral, with a dilated bract on the primary pedicels ; spines straight or curved, geminate or alternate, usually mingled with setaceous prickles, rarely unarmed ; stem erect or ascending ; stipules adnate to the common petiole ; leaflets 5 to 9 on flowering branches.

Sub-Group GYMNOCARPÆ : sepals early deciduous with the apex of the fruit ; stems more or less prickly.

1. *Rosa gymnocarpa*.

Sub-Group ALPINÆ : sepals erect and persistent on matured fruit ; stems either smooth or armed with scattered prickles, rarely with geminate spines.

2. *Rosa blanda*.

3. *Rosa blanda*, var. *Arkansana*.

4. *Rosa acicularis*.

Sub-Group EUCINNAMOMEÆ : sepals erect and persistent on matured fruit : stems armed with geminate, rarely alternate spines ; more or less prickly.

5. *Rosa Nutkana*.

6. *Rosa pisocarpa*.

7. *Rosa Californica*.

8. ? *Rosa spithamea*.

1. *Rosa gymnocarpa*, Nuttall, 1840, ranges from British Columbia to California, and eastward to Idaho and Montana. Its peculiar dehiscence, so far as is known, distinguishes it from all other North American roses. Two Asiatic species, *Rosa Alberti*, Regel (1883), and *Rosa Beggeriana*, Schrenck (1841), are, as I am informed by M. Crépin, the only roses of this sub-group in the Old World. To know the actual relations of these three closely allied species would be extremely interesting.

2. *Rosa blanda*, Aiton 1789 (? *R. Virginiana*, Miller, 1768) ranges from Newfoundland westward through Quebec, Ontario, New York, to Wisconsin and Illinois, where it passes into var. *Arkansana*. The stem of the type is either smooth or sparingly prickly ; the sepals, stipules and leaflets rarely glandular. It is distinguished from the *Carolinæ* by the absence of geminate spines, by its erect, persistent sepals and by the basilo-parietal insertion of its ovules.

*Journal of the Royal Hort. Soc. Part III. Vol. XI., Oct. 1889,

3. *Rosa blanda*, Ait. var. *Arkansana*, (Porter). Although frequently observed before, it was first described by Dr. Porter as *Rosa Arkansana** from specimens collected on the banks of the Arkansas River by Mr. Brandagee. The original specimen, in flower, is in the herbarium of Lafayette College. Bush apparently low, 1 to 2 feet high; stem, foliage and fruiting receptacles glaucous; flowers corymbose; sepals entire; bracts lanceolate; leaflets 7 to 11, mostly 9, oblong-elliptical to oblanceolate, somewhat cuneate at base; stipules rather broad; stem prickly.

The stipules are as often broad as narrow; the outer sepals are rarely lobed, probably not much more frequently than in *R. blanda*, from which it is distinguished by its habit of growth, its glaucousness, by one or two pairs more of leaflets, its prickly stem and by its being more or less glandular. It would therefore appear that the characters relied upon to differentiate it from the type lack specific distinctness.

Var. *Arkansana* ranges from Texas and New Mexico northward to British America and westward to the Rockies and probably beyond. It undergoes many modifications. On dry prairies it becomes markedly surculose; its rhizomes are transformed into in-ground stems which give off annual shoots like flowering branches. Since these rhizomes have no leaves, the demand for more foliage is met by an extra pair of leaflets on the suckers. In protected locations, as margins of woods and thickets, it attains a height of from three to five feet, with stem either smooth or prickly, and lives for years. It is sometimes found densely resinous. Like *R. blanda*, rudimentary glands on the sepals and stipules and under surfaces of the leaflets are rarely absent. When its flowers are solitary, as sometimes happens, the low prickly forms bear some resemblance to *Rosa acicularis*, from which it is readily distinguished by its glaucous stem and foliage, leaflets more numerous and of another shape.

4. *Rosa acicularis*, Lindley, 1820, ranges through the northern portions of Europe, Asia and North America. In the New World it extends from Alaska south to about 45° latitude; from the Pacific eastward to Michigan and James Bay. Its synonyms appear to be *R. acicularis*, var. *Bourgeauiana*, Crépin; *R. Sayi*,

*Synopsis of the Flora of Colorado, 1874.

Schwein., a resinous form, and *R. Engelmanni*, S. Watson, a form with oblong fruit.

After having carefully examined several European and Asiatic specimens of this species and a large number of American forms, including the original *R. Sayi* in the Phila. Academy, I cannot find any character of recognized value to separate them. The forms of the New World are usually somewhat more resinous but not constantly so, and the fruit probably more inclined to be globose. These variations are far from being uncommon in other species, as a result of differences in environment. To multiply species therefore, because one specimen has a few more hairs or a few less glands than another, or perchance fruit of a slightly different shape, seems uncalled for.

Rosa acicularis is from one to three feet high, more or less prickly, sometimes densely so; prickles rarely enlarged about nodes simulating geminate spines; leaflets 3 to 7, usually 5 to 7, broadly elliptical to oblong-lanceolate, mostly obtuse or slightly cordate at base, flowers solitary; fruit sometimes globose but usually more or less oblong.

5. *Rosa Nutkana*, Presl, 1857, ranges from western Montana, Idaho, Oregon and Washington northward and probably southward. In its densely resinous forms with stout recurved spines and broad stipules, it is not easily confounded with any other species. Forms, however, occur which are nearly or quite destitute of glands, with straight, slender, sometimes ascending spines, frequently absent or reduced to a single one in the upper part of the stem, leaflets larger and simply toothed, and which are difficult to separate from unarmed forms of *R. acicularis*. The fruit of *R. Nutkana*, large, coriaceous, thick-walled and fibrous, with seeds larger than in any other species, serves to distinguish it.

6. *Rosa pisocarpa*, Gray 1882 (? *R. Woodsii*, Lindley 1820). In "*Primitiæ*" p. 432, M. Crépin describes *R. Fendleri* from a specimen collected in New Mexico. This description is based on a stunted growth with straight slender spines, small leaflets and solitary flowers. He is now, however, inclined to regard it as being practically the same as *R. pisocarpa*, in which opinion I fully concur; but Dr. Sereno Watson considers them quite distinct.

Limited space prevents me from entering into details; I shall, therefore, merely state my conclusions.

As in *R. Nutkana*, and in fact, as in all the *Eucinna momeæ*, the spines, which are normally more or less curved, may become straight and slender and not infrequently ascending in the upper part of the bush; so in *R. pisocarpa*.

To divide specimens in two sections, one with straight or ascending spines, and the other with stout recurved spines, would indicate little experience in observing the variability of Roses. Moreover this treatment has been tried with *R. Nutkana* and wisely discontinued.

R. pisocarpa, in its varying forms is widely distributed, ranging from New Mexico to British America, possibly as far north as Alaska (Crepin). It affects low wet locations, attaining a height of 10 to 12 ft. in such, but is much reduced when growing in drier, less fertile ground. Fruit is usually small, ordinarily clustered, rarely solitary; seeds small, dull white; stipules short, usually narrow; leaflets rather small, oblong-ovate to-obovate, usually simply toothed; fascicles of adventitious branches are quite common in the upper part of the bush, especially when reclining.

R. Woodsii is closely related to *R. pisocarpa*. In fact many of the specimens found in herbaria and so labelled are of this species; others have a marked resemblance to *R. blanda*, var. *Arkansana*. As before stated, an occasional small lobe to the outer sepals has little diagnostic value. It may be here remarked that when two or more species grow together, especially if on the limits of each, intermediate forms are common, apparently due either to the influence of a common environment or to hybridization, or to both combined.

Rosa Californica, Cham. and Schlecht. 1827 is badly delimited. M. Crépin speaks of it as a "chaos veritable." The material placed in my hands has been so little, and that little so contradictory, that I have not reached any satisfactory conclusions respecting it. I suspect, however, that one or two good species will be found in the débris when it is thoroughly elaborated. It is quite possible that variations of known species may figure largely in this heterogeneous mass.

A flowering specimen in the herbarium of Lafayette College, collected by Prof. Rothrock at Santa Barbara, seems distinct, but whether it is Chamisso's Rose I cannot tell. It is the terminal portion of a bush, probably 3 ft. high, with stout recurved geminate spines (resembling those of *R. Canina*) without prickles; sepals entire; flowers solitary or corymbose, on short, densely pubescent pedicels; stipules pubescent, narrow, with diverging apices; fruiting receptacle ovate; leaflets 5 to 7, elliptical to oblong-obovate, broadly obtuse or truncate at the apex, tapering to the base, glabrate above, villose-pubescent beneath; serrations compound-glandular. This doubtless varies with spines nearly straight, stem taller and prickly, and with leaves, stipules and pedicels with varying degrees of pubescence and glandulosity.

8. Many roses take on a surculose habit, which would appear to be due to unfavorable conditions of growth or to severe cold. As we have seen, var. *Arkansana* is an example, as are also certain forms of *R. humilis* and *R. foliolosa*. *R. Californica* likewise seems so disposed. In Bot. Calif. 2, 444, Dr. Watson describes *R. spithamæa*. Subsequently, however, he regards it as a "dwarf form of the resinous variety." * Specimens of this, collected by Mr. Rattan along the Trinity River, and kindly loaned me by Dr. Watson, seem to warrant his conclusion. It is most probably a surculose form of some rose which grows stouter under more favorable conditions.

The same may be said of specimens collected by Prof. E. L. Greene in Petrified Forest, Sonoma County, and which differ in several respects from those collected by Mr. Rattan. It would seem probable that these are a surculose form of a closely related yet distinctive species. The description here given is based on specimens in fruit, furnished by Drs. Porter and Britton. Stem 6 to 10 inches high, with stout prickles and long straight or slightly recurved geminate spines; leaflets 5, roundish-ovate, petiolulate, broad and markedly inequilateral at base, crenate-serrate, toothing obtuse, apiculate and serrulate; stipules short, broadest below the middle, apices diverging; flowers many in flat-topped corymbs; sepals short, oblong-lanceolate, pointed, erect and persistent on matured fruit; styles gradually enlarged upward, capitate; pedi-

*Proc. of the Am. Acad., Vol. 20, p. 344.

cels short, glandular-pubescent, as also sepals and fruit; fruit small, yellowish-brown, globose, densely clustered, hispid, pulp scanty, minutely tuberculate; seeds few, large, insertion basilo-parietal. This may be a good species or a surculose form of a good species.

White Mountain Willows—IV.

BY M. S. BEBB.

Salix argyrocarpa × *phylicifolia*, F. & B. nov. hyb. Year old twigs, stout, dark purple and pruinose; leaves much as in *argyrocarpa*, but twice the size, equally glaucous but less silky beneath, strongly rugose-veined, the margin revolute especially near the base and more coarsely undulate-crenate; fertile aments (the staminate plant has not been found) more as in *phylicifolia*, but shorter and more leafy bracted at the base, capsule more silvery-silky, pedicel scarcely longer, style equally produced, stigmas entire, of a beautiful purplish-red, while those of *phylicifolia* are yellow.

Mr. Faxon remarks of the plant as observed growing: "The hybrid is of about the same height as *phylicifolia*, and I have not yet found it except in Tuckerman's Ravine associated with this species and *argyrocarpa*. It is very distinct in habit, and easily distinguished from either at a distance of more than one hundred feet; from *phylicifolia* by its dull glaucous color and more upright branching; from *argyrocarpa* by its being so much taller. It grows in patches like *phylicifolia*, both frequently entirely surrounded by *argyrocarpa*, but I think the latter does not extend to so low a level as the hybrid, and the hybrid not so low as *phylicifolia*. The youngest leaves on the growing tips of the hybrid are of the same color as the older ones, whereas in *phylicifolia* the new shoots have leaves of a reddish or brownish hue. In fine, it seems like a larger *argyrocarpa* with aments of *phylicifolia*."

In looking over some old sheets of *S. phylicifolia* in Dr. Gray's herbarium, I came unexpectedly upon a single specimen of this hybrid—leaves only, very much discolored, very much poisoned and attached to a sheet of that thin, bluish paper which marks the earliest mounts of this herbarium. The label, in the handwriting of Mr. Carey, is very interesting. First comes "S.